

## CLAIMS

- 1 1. A power amplifier system comprising:
- 2 a plurality of amplifiers, each of which includes a differential input that is commonly
- 3 coupled to a system input port, and each of which includes a differential output;
- 4 a plurality of primary transformer windings, each of which is coupled to the differential
- 5 output of one of the plurality of amplifiers; and
- 6 a single secondary transformer winding that is inductively coupled to all of said primary
- 7 transformer windings and which provides a system output port to which a load may be
- coupled.
2. A power amplifier system as claimed in claim 1, wherein said each of said primary
- transformer windings provides at least substantially the same number  $N$  of winding turns so
- that the turns ratio from each primary transformer winding to the secondary transformer
- winding is  $N:1$ .
3. A power amplifier system as claimed in claim 2, wherein the current provided by each
- amplifier is  $i_1 = i_2 / (mN)$  where  $i_2$  is the current in the secondary transformer winding, and  $m$
- is the number of the plurality of primary transformer windings.
4. A power amplifier as claimed in claim 2, wherein each of said primary transformer
- windings provides exactly the same number  $N$  of winding turns.
5. A power amplifier as claimed in claim 2, wherein said system permits mismatch in the

2 number of turns of each of said primary transformer windings.

1 6. A power amplifier system as claimed in claim 1, wherein said plurality of primary  
2 transformer windings are spatially distributed on a circuit board to reduce localized heating on  
3 the circuit board.

1 7. A power amplifier system as claimed in claim 1, wherein system includes two primary  
2 transformer windings.

1 8. A power amplifier system as claimed in claim 1, wherein said system includes three  
primary transformer windings.

9. A power amplifier system as claimed in claim 1, wherein said system includes four  
primary transformer windings.

10. A power amplifier system comprising:

a plurality of  $m$  amplifiers, each of which includes a differential input that is commonly  
coupled to a system input port, and each of which includes a differential output;

4 a plurality of  $m$  primary transformer windings, each of which has substantially the same  
5 number  $N$  of windings, and each of which is coupled to the differential output of one of the  
6 plurality of amplifiers; and

7 a single secondary transformer winding that is inductively coupled to all of said primary  
8 transformer windings such that the turns ratio from each primary transformer winding to the  
9 secondary transformer winding is  $N:1$ .

1 11. A power amplifier system as claimed in claim 10, wherein the current provided by each  
2 amplifier is  $i_1 = i_2 / (mN)$  where  $i_2$  is the current in the secondary transformer winding.

1 12. A power amplifier system comprising:  
2 a plurality of  $m$  primary transformer windings, each of which has substantially the same  
3 number  $N$  of windings; and  
4 a single secondary transformer winding that is inductively coupled to all of said primary  
5 transformer windings such that the turns ratio from each primary transformer winding to the  
secondary transformer winding is  $N:1$ .

13. A power amplifier system as claimed in claim 12, wherein the current provided to each  
primary transformer winding is  $i_1 = i_2 / (mN)$  where  $i_2$  is the current in the secondary  
transformer winding.

14. A power transformer system as claimed in claim 12, wherein said plurality of primary  
transformer windings are spatially distributed on a circuit board to reduce localized heating on  
the circuit board.

1 15. A power transformer system as claimed in claim 12, wherein said system further  
2 includes a plurality of amplifiers, each of which is coupled to one of the plurality of primary  
3 transformer windings.

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